

## READERS OPINION

# Systemic benefits and potential uses of tualang honey in addition to its beneficial effects on post-menopausal bone structure

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To the Editor,

I read the recent article by Zaid et al. (1) with great interest. Recent research has shown that tualang honey may have a number of systemic benefits in addition to its protective effect on bone structure in post-menopausal animal models.

Tualang honey has considerable potential as an anti-cancer agent. For example, it exerts anti-proliferative activities against breast cancer tissue, attenuating tumor growth in MDA-MB-231 and MCF-7 cell lines (2). These anti-neoplastic effects are mediated by caspase 2 and caspase 9 activation and a reduction of the mitochondrial membrane potential in cancer cells, reflecting an increase in apoptosis. Tualang honey administration also produces early apoptosis in osteosarcomas in a dose-dependent manner (3) and attenuates proliferation in HeLa cell lines (2). Apoptosis is also enhanced in oral squamous cell carcinomas following exposure to tualang honey (3).

Furthermore, tualang honey reduces photo-carcinogenesis secondary to ultraviolet B radiation exposure (4). These anti-carcinogenic effects are mediated by an attenuation of PGE-2 synthesis and inhibition of the nuclear translocation of NF- $\kappa$ B in keratinocytes. Methanol extracts of tualang honey also decrease proliferation in keloid fibroblasts and may thus be of clinical use in the dermatological treatment of keloids (5). Interestingly, gamma radiation enhances the anti-oxidant potential of tualang honey (6).

Tualang honey is considered by some to be the natural equivalent of "hormone replacement therapy". For example, short-term memory is improved in post-menopausal women following the administration of tualang honey (7), which is comparable to the increase in short-term memory observed after the administration of estrogen/progesterone combination therapy. The administration of tualang honey also attenuates atrophy in uterine tissue and increases vaginal epithelium thickness (8). It is also associated with a lower post-menopausal increase in body weight.

Tualang honey also decreases the wound size of burns and provides enhanced control and containment of burn infections, especially by bacteria such as *Pseudomonas aeruginosa*

(9). Tualang honey also exerts anti-oxidant activities against pancreatic cells, thus reducing hyperglycemia in diabetic models (10).

The above examples clearly illustrate the various potential uses of tualang honey and the need for further studies to fully elaborate the extent of its properties.

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